1. An interferometric strain gage sensor which comprises:

a support;

a first layer of polymeric material having a first refractive index;

a second layer of polymeric material having a second refractive index which second refractive index is distinct from the first refractive index, the sensor having a gage factor of at least 100 and light energy communicates with the sensor, when a strain is applied to the sensor, the light energy is partly absorbed and the change in light energy correlates to the strain applied.

2. The sensor of claim 1 which comprises:

a plurality of alternating first and second layers.

3. The sensor of claim 2 wherein the first layer has a refractive index of approximately 1.6 to 1.7 and is selected from the group consisting of polyimides and polycarbonates.

4. The sensor of claim 3 wherein the first layer is polyimide.

5. The sensor of claim 2 wherein the second layer has a refractive index of about 1.4 and is selected from the group consisting of polysiloxane, polyethylene, polypropylene, Teflon®, polyvinylidene fluoride and polyester.

6. The sensor of claim 5 wherein the second layer is polysiloxane.

7. The sensor of claims 4 or 6 wherein the thicknesses of the layers are between about 1 to 20 microns.

8. The sensor of claim 1 which comprises:

means for contacting the sensor with light energy; and

means for measuring changes in the light energy.

9. The sensor of claim 1 wherein the sensor is a passive sensor and one of said layers is filled with particulate.

10. The sensor of claim 9 wherein there are multiple first and second layers in alternating relationship, the first layer selected from the group consisting of polyimides and polycarbonates, the second layer selected from the group consisting of polysiloxane, polyethylene, polypropylene, Teflon®, polyvinylidene fluoride and polyester.

11. The sensor of claim 10 wherein the first layer is polyimide and the second layer is polysiloxane filled with aluminum oxide particulate.

12. The sensor of claim 9 which comprises:
means for contacting the sensor with light energy; and
means for measuring changes in the light energy.

13. The sensor of claim 1 wherein the sensor is an active strain gage and comprises a tube-like support for the first and second layers.

14. The sensor of claim 13 wherein the first layer has a refractive index of approximately 1.6 to 1.7 and is selected from the group consisting of polyimides and polycarbonates, and wherein the second layer has a refractive index of about 1.4 and is selected from the group consisting of polysiloxane, polyethylene, polypropylene, Teflon®, polyvinylidene fluoride and polyester.

15. The sensor of claim 14 wherein the outer most layer is coated with aluminum.

16. The sensor of claim 15 which comprises:
means for contacting the sensor with light energy; and
means for measuring changes in the light energy.